

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method for quantitatively determining a width of a soft zone area of a partially hardened metallic workpiece, which has at least one hardened and one unhardened area, ~~by means of~~with at least one multifrequency eddy current sensor, wherein:

a single workpiece is individually moved relative to the multifrequency eddy current sensor ~~in such a manner~~so that a spatially limited eddy current field generated by the multifrequency eddy current interacts with the workpiece contactlessly, generates eddy currents therein which, ~~in turn~~, generate a measuring signal in the multifrequency eddy current sensor, in which the spatially limited eddy current field has a greatest extension oriented ~~in along a longitudinal direction to the~~along a longitudinal direction of the surface of the workpiece, ~~which the greatest extension is of the eddy current field being~~ greater than ~~the a~~ maximum extension of the soft zone area ~~in along the~~ longitudinal direction of the surface of the workpiece; and

~~measuring~~ a number n of workpieces for calibrating purposes is measured, ~~with using~~ the measuring signals of the n workpieces ~~being utilized to plot a~~ calibration curve using a predetermined standard size of the ~~a~~ width of the soft zone, with a desired size of an extension oriented in ~~a~~ longitudinal direction of the soft zone area ~~of the n workpieces~~, and ~~assigning~~ an absolute soft zone width is assigned to ~~the~~ measuring signals based on the calibration and ~~which are obtained~~ from each individual workpiece.

2. (Currently Amended) The method according to claim 1, wherein:
the workpieces are ~~designed~~cylindrical and are moved relative to the eddy current sensor along ~~their a~~ cylindrical axis ~~thereof~~.

3. (Currently Amended) The method according to claim 1, wherein:

the workpieces are planet wheel bolts which have a cylindrical geometry and two soft areas lying-located on the front-ends thereof separated by a hardened middle area, with the middle area having a greater axial extension than the soft zone areas, which each usually have an axial extension, withand a soft zone width, of from 1.5 mm to 2.5 mm.

4. (Currently Amended) The method according to , claim 1 wherein:

the multifrequency eddy current sensor is operated in such a manner so that during measuring of a workpiece, which moves continuously relative to the multifrequency sensor with a constant velocity, a multiplicity of measuring signals is generated and plotted as an amplitude locus curve; and

from at least one part of the amplitude locus curve a measuring constellation is selected in which the workpiece has a defined position to the multifrequency eddy current sensor, in which defined position a measuring signal is recorded which is used to determine the-a width of the soft zone.

5. (Currently Amended) The method according to claim 4, wherein:

the defined position is selected in such a manner so that the eddy current field of the multifrequency eddy current sensor completely contains the soft zone area at least in longitudinal extension to the-a direction of movement.

6. (Previously Presented) The method according to claim 4, wherein:

the defined position is determined solely by evaluation of the amplitude locus curve.

7. (Currently Amended) The method according to claim 1, wherein:

a multifrequency eddy current sensor operatable with four different testing frequencies is used as the multifrequency eddy current sensor.

8. (Currently Amended) The method according to claim 1, wherein:
the workpieces are planet wheel bolts which have a cylindrical geometry and

two soft areas lying located on the front ends thereof separated by a hardened middle area, with the middle area having a greater axial extension than the soft zone areas, which each usually have an axial extension, with and a soft zone width, ef from 1.5 mm to 2.5 mm.

9. (Currently Amended) The method according to claim 2 wherein:
the multifrequency eddy current sensor is operated in such a manner so that during measuring of a workpiece, which moves continuously relative to the multifrequency sensor with a constant velocity, a multiplicity of the measuring signals is are generated and plotted as an amplitude locus curve; and

from at least one part of the amplitude locus curve a measuring constellation is selected in which the workpiece has a defined position to the multifrequency eddy current sensor, in which defined position a measuring signal is recorded which is used to determine the-a width of the soft zone.

10. (Currently Amended) The method according to claim 3 wherein:
the multifrequency eddy current sensor is operated in such a manner so that during measuring of a workpiece, which moves continuously relative to the multifrequency sensor with a constant velocity, a multiplicity of the measuring signals is are generated and plotted as an amplitude locus curve; and

from at least one part of the amplitude locus curve a measuring constellation is selected in which the workpiece has a defined position to the multifrequency eddy current sensor, in which defined position a measuring signal is recorded which is used to determine the-a width of the soft zone.

11. (Currently Amended) The method according to claim 9, wherein:
the defined position is selected ~~in such a manner so~~ that the eddy current field of the multifrequency eddy current sensor completely contains the soft zone area at least in a longitudinal extension relative to the a longitudinal direction of movement.

12. (Currently Amended) The method according to claim 10, wherein:
the defined position is selected ~~in such a manner so~~ that the eddy current field of the multifrequency eddy current sensor completely contains the soft zone area at least in a longitudinal extension relative to the a longitudinal direction of movement.

13. (Previously Presented) The method according to claim 11, wherein:
the defined position is determined solely by evaluation of the amplitude locus curve.

14. (Previously Presented) The method according to claim 12, wherein:
the defined position is determined solely by evaluation of the amplitude locus curve.

15. (Currently Amended) The method according to claim 2, wherein:
a multifrequency eddy current sensor operable with four different testing frequencies is used as the multifrequency eddy current sensor.

16. (Currently Amended) The method according to claim 3, wherein:
a multifrequency eddy current sensor operable with four different testing frequencies is used as the multifrequency eddy current sensor.

17. (Currently Amended) The method according to claim 4, wherein:
a multifrequency eddy current sensor operable with four different testing frequencies is used as the multifrequency eddy current sensor.

18. (Currently Amended) The method according to claim 5, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
19. (Currently Amended) The method according to claim 6, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
20. (Currently Amended) The method according to claim 8, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
21. (Currently Amended) The method according to claim 9, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
22. (Currently Amended) The method according to claim 10, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
23. (Currently Amended) The method according to claim 11, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
24. (Currently Amended) The method according to claim 12, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.
25. (Currently Amended) The method according to claim 13, wherein:
a multifrequency eddy current sensor operable-with four different testing
frequencies is used as the multifrequency eddy current sensor.

26. (Currently Amended) The method according to claim 14, wherein:
a multifrequency eddy current sensor operable with four different testing
frequencies is used as the multifrequency eddy current sensor.